

BILLIARD, SNOOKER AND POOL CUE SHAFT

TECHNICAL FIELD OF THE INVENTION

The present invention relates to design and construction of cue sticks for billiard, pool, snooker and the like.

BACKGROUND ART

The art of cue sticks and shaft extensions for cue sticks consists of cue stick shafts manufactured from solid wood and graphite. These cue stick shafts and extension shafts typically provide strong frictional resistance to the player when in use and require the player to use hand powder, talcum powder, or some other external substance to reduce this friction between bridging fingers and shaft. The finishing of the wood and graphite cue stick shafts traditionally requires an extra coating step in manufacture, and is susceptible to wear, which degrades both functionality and appearance. The long-term wear and functional capabilities of graphite shafts are not known, and the use of carbon-fiber and graphite materials is expensive, while the materials are themselves fragile in some circumstances. Wooden cue stick shafts are susceptible to flaws inherent in the wood stock used, and to warping, twisting and deformation due to the nature of the materials used, which is detrimental to their usability to the player.

Previously, there have been inventions involving hollow-bodied cues, for instance Canadian Patent No. 233,389 teaches a hollow-bodied cue butt section with a removable tip section. The tip section is designed to be removed and may be placed into the hollow cue butt section for storage and transport. Canadian Patent No. 738,297 teaches a hollow-bodied cue stick wherein several segments could collapse longitudinally, telescoping within themselves, for ease of transport and storage. One draw back of this design is that a stick equal in length to the cue stick is required to be inserted within the cue stick to straighten the cue stick and to prevent the cue stick from collapsing during operation.

1 Canadian Patent No. 726,578 to Adler teaches a method of constructing a hollow tube for
2 use as a billiard cue or fishing rod using fiber and resin to form a hard hollow outer layer.
3 Stiffener rods and spring weights are then inserted into the hollow tube to alter the weight and
4 balance of the cue, and to provide the desired flex and kick. Once the manufactured cue stick has
5 the desired characteristics, it is filled with liquid foam, which hardens to form a one-piece
6 balanced fiberglass cue. Additional features of the Adler invention included novel ferrules,
7 joints, attachments of butt-bumpers and tips, and non-slip coatings. The Adler patent is limited to
8 the construction of cue sticks and fishing rods from foam-filled, weighted and balanced, resin-
9 impregnated glass fiber cloth, and necessary changes to fittings and fixtures. Additionally, Adler
10 discloses a cue that may only be weighted and balanced during initial construction. Once
11 manufactured, the cue sticks cannot be customized "in the field" at the retailer or after sale to an
12 end-user or altered to suit an end-user's requirements or desired characteristics. Adler also does
13 not address issues of cue shaft repair, and the materials disclosed are susceptible to damage,
14 cracking, chipping, and wear, as well as requiring significantly different and more numerous
15 steps in their manufacture.

16
17 Other products provide a limited number of cue sticks with adjustable weight and balance
18 after initial manufacture. Such cue sticks employed methods of attaching weighted washers or
19 similar devices onto the exterior of the cue stick, such as onto the existing butt end cap, or center
20 fastener ferrules or fittings in the case of two piece cue sticks. However, the cue stick's weight
21 was otherwise pre-determined by the materials and methods used in its initial construction.
22 Similarly, the flex and kick characteristics of the cue sticks were determined by the materials and
23 methods used in the cue sticks initial construction and finish.

24
25 Finally, an examination of the cues and parts and components available from major
26 manufacturers such as Brunswick™, Champion™, Dufferin™, Heubler™, Monarch™,
27 Macdermitt™, Harvard™, AMF™, Schmelke™, Wilson™, Spalding™, Excalibur™, Viper™,
28 Winston™, Zodiac™ and others has disclosed a variety of cue sticks and cue stick-sections.
29 However, the operational characteristics of such cue sticks are determined by the materials used

1 in their construction, and do not allow post-manufacture customization by the user or by a
2 customizer.

3
4 It is an object of the present invention to obviate or mitigate at least some of the above-
5 presented disadvantages.

6 7 SUMMARY DESCRIPTION OF THE INVENTION

8
9 In accordance with one aspect of the present invention there is provided a tip section for
10 customizing a cue stick. The tip section comprises a hollow tube having a first end and a second
11 end, the tube having an exterior providing a substantially smooth surface, the tube having a wall
12 capable of self- support. A first attachment site adjacent to the first end for connecting the tube to
13 a cue tip, and a second attachment site adjacent to the second end for connecting the tube to a
14 butt section.

15
16 In accordance with one aspect of the present invention there is provided a tip section for
17 customizing a cue stick. The tip section comprises a hollow tube having a first end and a second
18 end, the tube having an exterior providing a substantially smooth surface, the tube having a wall
19 capable of self- support. A first attachment site adjacent to the first end for connecting the tube to
20 a cue tip, and a second attachment site adjacent to the second end for connecting the tube to a
21 butt section. The tube further comprises an augmenting element securable to an interior position
22 within the hollow tube, the augmenting element being either a weight or a stiffening member.

23 Placement of the augmenting element in the interior position within the hollow tube is
24 determined by a locator. Placement of said augmenting element tailors an operational
25 characteristic of the hollow tube.

26
27 In accordance with another aspect of the present invention there is provided a kit for customizing
28 a tip section of a cue stick. The kit comprising a hollow tube having a first end and a second end,
29 the tube having an exterior providing a substantially smooth surface, the tube having a wall
30 capable of self- support. A first attachment site adjacent to the first end for connecting the tube to

1 a cue tip, and a second attachment site adjacent to the second end for connecting the tube to a
2 butt section. The kit can also include an augmenting element securable to an interior position
3 within the hollow tube, the augmenting element being either a weight or a stiffening member.
4 Placement of the augmenting element in the interior position within the hollow tube is
5 determined by a locator. Placement of said augmenting element tailors an operational
6 characteristic of the hollow tube.

7
8 It is an object of the present invention to provide a means of imparting adjustable weight,
9 balance, flex and kick operational characteristics of a tip section of a cue stick.

10
11 It is a further object of the present invention to provide a tip section for cue sticks which can be
12 either manufactured as a part of a two piece cue stick, manufactured as a single-piece cue stick,
13 or provided as a repair or replacement part for a cue stick.

14
15 It is a further object of the present invention to provide a substantially smooth surface to the
16 exterior of a tip section of a cue stick for sliding engagement over a surface.

17 18 BRIEF DESCRIPTION OF THE DRAWINGS

19
20 These and other features of the preferred embodiments of the invention will become more
21 apparent in the following detailed description in which reference is made to the appended
22 drawings wherein:

23
24 Figure 1 is an exploded view of a prior art example two-piece billiard cue stick.

25 Figure 2 is an exploded view of a two-piece cue stick.

26 Figure 3A, B and C are alternate embodiments of the tip section of figure 2.

27 Figure 4 is an alternate embodiment of the tip section of figure 2.
28
29
30

DESCRIPTION OF PREFERRED EMBODIMENTS

The present invention relates to the production of customized cue sticks to meet the specific demands of clients. More specifically, the present invention relates to the forward section or tip section of a cue stick in which certain operational characteristics relating to weight, balance, kick and flex may be altered. In a preferred embodiment, the tip section is a hollow, tapered tube, though non-tapered tubes may also be used in the construction of the tip section. Augmenting elements such as weights and stiffening members may be inserted into the interior of the tip section by the user or customizer after manufacture of the tip section to tailor certain operational characteristics of the tip section, and hence the cue stick.

A series of descriptive terms is used to describe certain operational characteristics of cue sticks. To facilitate the understanding of the preferred embodiments of the present invention described below, the following terminology will be used.

Weight - a term used to describe the overall weight of a cue stick.

Balance - a term used to describe the location of the center of gravity of a cue stick along its length, or the weight distribution of a cue stick along its length.

Flex - the amount of longitudinal rigidity of a cue stick's structure. A rigid cue stick is said to have little flex.

Kick - a term used by pool players to describe the tactile feedback during and after striking a ball with the cue stick. Advanced players typically seek very straight, low-flex, rigid cue sticks with more kick.

Several elements of the present invention that are common to conventional cue stick construction and assembly. These elements will be described with reference to Figure 1, which describes a two piece cue stick 44 known in the prior art. Cue sticks 44 are generally tapered cylinders having a wide end or butt end 3, and a narrow end 11. The cue stick 44 may be divided along its length into two sections: the tip section 7 extending from generally the middle 48 of the

1 cue stick towards the narrow end 11, and the butt section 30 extending from generally the middle
2 48 of the cue stick 44 towards the butt end 3.

3
4 The butt end 3 of a cue stick 44 may be terminated by a butt bumper 1, typically of
5 rubber and typically attached with a screw 2 to the butt end 3, and a trim ring 4 which may be
6 placed between the butt bumper 1 and the butt end 3. The narrow end 11 of the cue stick 44 is
7 terminated with a cue tip 40. At play, the cue tip 40 comes in direct contact with a ball to be
8 struck. The narrow end 11 of the tip section 7 has tip attachment point 35 for a cue tip 40. A cue
9 tip 40 is typically composed of a leather tip 14 with threaded brass body 13. Other configurations
10 of cue tips 40 are known in the art and may be used in the present invention. In one embodiment,
11 the tip attachment point 35 is provided by the insertion of a threaded nut 15 into the narrow end
12 11 of the tip section 7. The threaded nut 15 is preferably rounded, such that the outer part of the
13 threaded nut 15 resembles a slightly tapered cylinder. The threaded nut 15 is fixed in position by
14 a variety of methods known in the art such as friction, an adhesive, a set-screw, welding, and the
15 like. In a preferred embodiment, the threaded nut 15 is affixed in the narrow end 11 of the tip
16 section 7 by use of suitable epoxy-type adhesive. The threaded brass body 13 of the cue tip 40 is
17 then secured to the threaded nut 15.

18
19 At approximately the middle of the cue stick's length is provided a releasable joint 48.
20 Various examples are known for connecting the butt section 30 to the tip section 7 of two-piece
21 and multi-piece cue sticks 44. In one example, a bore 38 is drilled into the narrow end 36 of the
22 butt section 30 along the centerline. A bore 8 is also drilled into the wide end 34 of the tip
23 section 7 along the centerline. A threaded nut 9 is affixed into the bore 8 of the tip section 7. The
24 threaded nut 9 may be secured by use of an adhesive, or other methods known in the art. In an
25 alternative embodiment, the bore 8 may be threaded. A screw member 6 is then secured into the
26 bore 38 of the butt section 30. The screw member 6 being a size and thread such that it can be
27 mated with the threaded nut 9 or threads in bore 8 of the tip section 7. Typically, a joint collar 5
28 and a trim ring 10 will be placed between the butt section 30 and tip section 7 at the releasable
29 joint 48.

1 In an alternate embodiment, the joint 48 is a not a releasable joint, and the butt section 30
2 is permanently attached to the tip section 7 of the cue stick. Many examples are known to
3 permanently attach the tip section 7 to the butt section 30. In one embodiment, a bore 38 is
4 drilled into the narrow end 36 of the butt section 30 along the centerline. A bore 8 is also drilled
5 into the wide end 34 of the tip section 7 long the centerline. One end of a connector element 6 is
6 inserted into the bore 38 of the butt section 30, and the other end of the connector element 6 is
7 inserted into the bore 8 of the tip section 7. The connector element 6 is secured in place with the
8 use of a suitable epoxy-type adhesive, or other methods known in the art.

9
10 When the two pieces of the cue stick 44 of figure 1 are connected together, the cue stick
11 44 is operated by moving the cue stick 44 substantially along its longitudinal axis. Preferably the
12 tip section 7 is held or supported near the gaming table surface, with the cue tip 40 resting in
13 close proximity to a ball to be struck, such as the cue ball in pool. The butt section 30 is gripped
14 by the user's hand and is used to propel the cue stick 44 towards the ball to be struck.

15
16 With reference to Figure 2, the tip section 7 of the present invention is preferentially a
17 tapered tube 57 having a narrow end 11 and a wide end 34. The taper may be either gradual or in
18 small incremental reductions in diameter. Non-tapered tubes 57 may also be used in the present
19 invention, though non-tapered cue sticks 44 are not commonly used on the date of the present
20 invention.

21
22 In a preferred embodiment, the tube 57 is composed of a material such as steel or metal
23 selected for desired characteristics such as light-weight, strength, corrosion resistance, high
24 tensile strength, low compressibility. Examples of such metals include light-weight steel,
25 aluminum, steel, stainless steel, magnesium alloys, and the like. The tube 57 may also be
26 produced from other materials such as carbon fiber, graphite, fiberglass, ceramic, plastic and the
27 like. The interior of the tube 57 should provide a hollow space. The walls of the tube 57 should
28 be capable of self-support such that the tube 57 is sufficiently rigid and strong to strike a ball
29 along the tube's 57 longitudinal axis. The material used to construct the tube 57 may itself be
30 self-supporting, or the tube 57 may be capable of being self-supporting following the

1 introduction of elements into the interior of the tube 57 which increase the rigidity of the tube 57.
2 The tube 57 may be constructed of a material such that the weight of the tube 57 may be
3 approximately equal to the weight of an equal length of tip section 7 from a wooden cue stick 44.
4 In a preferred embodiment, the weight of the tube 57 is less than the weight of an equal length of
5 a tip section 7 from a wooden cue stick 44.
6

7 The cue stick 44 of the present invention may be used for a variety of games such as
8 pool, snooker, billiards, and the like. As will be obvious to those skilled in the art, such games
9 may differ in the regulations governing the dimensions of cue sticks 44. Therefore, in producing
10 a tip section 7 for billiards, a tapered tube 57 may be selected which has dimensions and taper
11 that conforms to the professional standards of dimensions and taper for billiard cue sticks. The
12 external diameter the wide end 34 of the taper tube 57 can be sufficient for the flush or
13 substantially flush attachment to a butt section 30. The narrow end 11 of the taper tube 57 can
14 have an external diameter sufficient for the flush or substantially flush attachment of a cue tip 40.
15

16 The tip section 7 of the cue stick 44 is supported near the ball to be struck by a bridge or
17 in the player's bridge hand. During the act of striking the ball, the tip section 7 is slid across the
18 bridge or hand. In one embodiment of the present invention, the tip section 7 has an outer surface
19 material which offers low resistance when in sliding contact with the bridge or bridge hand.
20 Hence, the tapered tube 57 used to construct the tip section 7 is preferably composed of material
21 capable of accepting a durable polished finish or chrome-plating or other similar high-gloss, low-
22 friction surface finish. Examples of such outer surface materials include, but are not limited to,
23 chrome-plating, polished aluminum, titanium, and the like.
24

25 An element of the present invention is a tip section 7 wherein certain operational
26 characteristics may be altered, such as the weight and balance and/or the flex and kick of the tip
27 section 7. The balance and weight of the tip section 7 and the cue stick 44 may be altered by the
28 introduction of weights 17, 47 into the hollow interior of the tip section 7. The weights 17, 47
29 may be placed in two general areas, the placement depends on the degree to which the weight
30 and balance of the cue stick 44 are to be altered. To effect changes in balance, a weight 17 may

1 be placed immediately behind the tip attachment point 35 such as from the narrow end 11 to 4
2 inches from the narrow end 11, as illustrated in figure 3a. Weights 17 placed behind the tip
3 attachment point 35 are typically less than 100 grams. To effect large changes in the weight and
4 balance of a cue stick, the weights 47 are placed in the tip section 7 from 12.5 to 25 inches from
5 the narrow end 11, as illustrated in figure 3b. The weights 47 in the tip section 7 from 12.5 to 25
6 inches from the narrow end 11 are typically less than 200 grams. A single weight 17 or 47 may
7 be inserted into the tip section 7, or combinations of two or more weights 17, 47 may be inserted
8 into the tip section 7.

9
10 The weights 17, 47 may be produced from a variety of materials such as wood, plastic,
11 metals and the like. As will be obvious to those skilled in the art, the choice of material used will
12 depend on the desired weight needed. The weights 17, 47 are preferably of a generally disc, cone
13 or cylinder shape, though weights 17, 47 of various shapes may be used. The weight 17, 47 may
14 also be provided in different lengths to provide the desired mass. The weight 17, 47 should be of
15 a shape and size such that it may enter into the desired area of the tip section 7. In a preferred
16 embodiment, the weights 17, 47 are fixed at a desired location within the tip section 7, the exact
17 position being determined by tailoring the outside diameter of the weight 17, 47 to the inside
18 diameter of the body of the tip section 7 at the desired location. The weights 17, 47 may also be
19 affixed in a specific area of the tip section 7 by various methods such as adhesives, welding and
20 the like.

21
22 To alter the flex and kick of a cue stick 44, a stiffening member 19 may be inserted into
23 the interior of the tip section 7. Stiffening members 19 are generally longer than a typical weight
24 17, and the shapes may include solid cylinders, tubes, cones, and the like. Stiffening members 19
25 may be manufactured from a variety of materials such as wood, plastic, high-tensile metal, steel,
26 and the like. The choice of material from which the stiffening member 19 is produced will
27 depend on the desired magnitude of the change required in flex and kick. One location for the
28 stiffening member 19 is behind the weight 17 located adjacent to the narrow end 11. Small
29 changes in flex and kick may be affected by the use of wood and perhaps plastic stiffening
30 members. Larger changes in flex and kick require the use of plastics and metal stiffening

members. The stiffening member 19 will be affixed within the tip section 7 behind the tip attachment point 35. If a weight 17 is behind the tip attachment point 35, then the stiffening member 19 is placed behind the weight 17 toward the wide end 34 of the tip section 7. The insertion of stiffening members 19 may be either in addition to, or instead of the addition of weights 17, 47. Typical stiffening members 19 are between 1 and 10 inches in length.

In an alternate embodiment, illustrated in figure 3c, the stiffening member 19 may be a hollow section of metallic tubing of the same material used to construct the tip section 7. Such an embodiment will effect more extreme changes in flex and kick of the cue stick, as well as affecting the weight and balance of the cue stick. The diameter of the stiffening member 19 should be less than the interior diameter of the tip section 7 to allow the stiffening member 19 to be inserted into the tip section 7.

The positioning of weights 17, 47 and stiffening member 19 within the tip section 7 will affect the overall weight, balance, flex and kick of the tip section 7. The ability to customize the tip section 7 of the present invention to the desired operational characteristics of the user depends on the ability to position the weights 17, 47 and stiffening member 19 within the tip section 7. Positioning the weights 17, 47 and stiffening member 19 is achieved by a locator. Although the exact nature of the locator may differ in the various embodiments, the function of the locator will be to position the weights 17, 47 and stiffening member 19 within the tip section 7.

In one embodiment, the locator is spacer material 21 inserted into the interior of the tube to position the weights 17, 47 and stiffening members 19 within the tip section 7. Spacer material 21 is typically material which is sufficiently dense to inhibit movement of the weights 17, 47 and stiffening members 19. An example of spacer material 21 is closed cell foam plastic, though other materials such as balsa wood may also be used. Pieces of the spacer material 21 may be cut and shaped to fit into the interior of the tip section 7. The spacer material 21 may be inserted into the tip section 7 and used to temporarily secure the position of the weights 17 and stiffening members 19 until the cue stick has the desired operational characteristics. Once the desired operational characteristics have been attained, the spacer material 21, weights 17, 47 and

1 stiffening members 19 may be secured into position by the use of adhesives, or other securing
2 means previously described.

3
4 In an alternate embodiment, the locator is spacer material 21 shaped to match the
5 dimensions of the interior of the tip section 7, such as in the form of a spacer rod 56. Spacer
6 material 21 is removed from the tip section 7 and sections of the spacer material 21 may be cut
7 out of the rod 56 and replaced with either weights 17, 47 or stiffening member 19. The weight
8 17, 47, stiffening member 19 and spacer material 19 may then be inserted into the tip section 7.
9 The positions of the weights 17, 47 and stiffening elements 19 may be altered by replacing
10 different sections of spacer material with weights 17, 47 and stiffening elements 19 until the
11 desired operational characteristics are achieved. The stiffening member 19 may also be secured
12 by suspending the stiffening member 19 between two pieces of spacer material 21.

13
14 In another embodiment, the locator may be a small tube which fits into the interior space
15 of the hollow tube 57. Weights 17, 47, stiffening member 19, and spacer material 21 may be
16 inserted into the small tube, which is fitted into the hollow tube 57 of the tip section 7. The
17 position and composition of the weights 17, 47 and stiffening members 19 may be changed until
18 the operational characteristics of the tip section 7 and the cue stick 44 are acceptable to the user.
19 The weights 17, 47 and stiffening member 19 may then be secured within the small tube, which
20 is then secured in the tip section 7. Alternatively, the weights 17, 47 and stiffening member 19
21 may be secured directly within the tip section in positions corresponding to their placement
22 within the small tube.

23
24 In another embodiment wherein the interior space of the tube is tapered, and the locator
25 may be the use of the taper to position the weights 17, 47 and stiffening members 19. The outside
26 diameters of the weights 17, 47 and stiffening members 19 may be tailored to match the inside
27 diameter of the tip section 7 at the location where the weight 17, 47 or stiffening member 19 is to
28 be placed. The user may be provided with a variety of weights 17, 47 and stiffening members 19
29 of varying diameters, which may be inserted into the tip section 7 in various combinations until
30 the operational characteristics of the cue stick 44 are acceptable to the user. The weights 17, 47

1 and stiffening members 19 may then be secured in position by the use of adhesive, friction or
2 other securing means. Alternatively, the outside diameters of the weights 17, 47 and stiffening
3 members 19 may be altered by a variety of methods. In one embodiment, the diameters are
4 altered by the addition or removal of tape from around the weights 17, 47 and stiffening
5 members 19. The diameter of the weights 17, 47 or stiffening members 19 may be decreased by
6 the use of a lathe or by whittling.

7
8 The locator may include a ruler 55 or other measuring devise that may be inserted into
9 the interior of the tip section 7. A weight 17, 47 or stiffening member 19 is inserted into the tip
10 section 7, and the ruler may be used to push the weight 17, 47 or stiffening member 19 a desired
11 distance into the tip section 7. The ruler 55 used as the locator, the weights 17, 47 and stiffening
12 members 19 may be of a shape to allow insertion into the interior of the tip section 7. Once in the
13 desired location, the weight 17, 47 and stiffening member 19 may be secured into position by the
14 use of adhesives of other methods described above.

15
16 Following the introduction of the weights 17, 47 and stiffening members 19 into the tip
17 section 7, the cut tip attachment site 35 and the butt section attachment site 9 may be attached to
18 the narrow end 11 and wide end 34 of the tip section 7, respectively. An embodiment of the
19 present invention, illustrated in Figure 2, is of a cue stick 44 of a detachable two piece design.
20 The present invention may also be applied to one-piece cue sticks wherein the two pieces
21 illustrated in figure 2 are permanently attached to one another. In such a design, the tip section 7
22 may be attached to a wooden butt section 30 or to a butt section 30 compose of the same material
23 as the tip section 7. In an alternate embodiment, the entire cue stick may be produced from one
24 piece of tapered tube. In such an embodiment, the joint member 48 is not present. It is
25 recognized that the weight 17, 47, spacer 21 and stiffening members 19 can be inserted and
26 secured s described above in a hollow butt section 30, if desired.

27
28 In certain circumstances, a wooden cue stick 44 may become damaged or warped near
29 the tip end 11, or the tip end 11 may become deformed, cracked, or broken off. Ordinarily, such
30 a cue stick 44 would be discarded. In one embodiment, the tip section 7 may be attached to the

1 butt section 30 of a damaged cue stick. The damaged cue stick's tip section 7 is removed. A
2 hollow tube 57 is prepared wherein the length, diameter and taper is similar to the removed tip
3 section 7. The narrow end 36 of the butt section 30 may be fitted with an attachment site for a
4 releasable or non-releasable joint member 48. Alternatively, the diameter of the narrow end 36 of
5 the butt section 30 may be reduced to allow it to fit into the internal diameter of the wide end 34
6 of the tip section 7. The diameter of the narrow end 36 of the butt section 30 may be reduced by
7 whittling, being turning, sanding or shaving. The operational characteristics of the tip section 7
8 may be tailored by the insertion of weights 17, 47 and stiffening members 19 as previously
9 described. The tip section 7 may then be attached to the prepared butt section 30. The attachment
10 may be permanent or a releasable joint 48, as described above.

11
12 The tip section 7 may be manufactured either to standard specifications into an assembled
13 unit, or can be partly assembled to allow for customization to suit specific requirements of the
14 user. An embodiment of the present invention is to provide the tip section 7 in a kit form. Such a
15 kit may include a hollow tube 57 having, at one end, an attachment point 35 for a cue tip 40 and,
16 at the opposite end 34, an attachment point 8 for a butt section 30. The kit may also include
17 weights 17, 47 and stiffening members 19 and a locator such as spacer material 21. The kit may
18 then be assembled and the operational characteristics of the tip section modified to specifications
19 of the user.

20
21 It should be noted that alterations to the weight, balance, flex and kick and overall
22 operational characteristics of a cue stick can be accomplished by the insertion of weights 17, 47
23 stiffening members 19 and spacer material 21 as noted above in certain sizes, shapes,
24 compositions and locations within the tip section 7. As such, the exact dimensions of the
25 materials added will be determined by or in consultation with the user, by trial and error, by
26 calculation, or by some combination of those activities. The criteria for successful adjustment of
27 the weight, balance, kick and flex of the resulting cue stick 44 being the satisfaction of the
28 individual user with the cue stick 44 in play.

1 Although the invention has been described with reference to certain specific
2 embodiments, various modifications thereof will be apparent to those skilled in the art without
3 departing from the spirit and scope of the invention as outlined in the claims appended hereto.